stress when the thermosetting adhesive 306b is hardened, and the IC chip 1 and the circuit board 4 are bonded together to electrically connect both the electrodes 2 and 5. Preferably, by setting the pressure P1 to 20 gf or more per bump for the reason that a minimum of about 20 gf is required for the deformation of the bump, i.e., in order to obtain the pressure required for the deformation and adaptation of the bump and force out the excessive resin from between the IC chip 1 and the board 4 and setting the pressure P2 less than 20 gf per bump in order to remove the hardening distortion unevenly distributed inside the ratio before the deformation or the like of the bump, the reliability is improved. The detailed reasons are as follows. That is, the stress distribution of the thermosetting resin in the thermosetting resin sheet 6 or the thermosetting adhesive 306b is increased on the IC chip 1 side and the board 4 side at the time of pressure bonding as shown in Fig. 49C.

In this state kept intact, if fatigue is repetitively given through a reliability test and normal long-term use, then the thermosetting resin in the thermosetting resin sheet 6 or the thermosetting adhesive 306b sometimes unable to endure the stress and may separate on the IC chip 1 side or the board 4 side. If the above state occurs, then the adhesive strength of the IC chip 1

and the circuit board 4 becomes insufficient and the bonded portion becomes open. Accordingly, by adopting a two-step pressure profile of the higher pressure P1 and the lower pressure P2 as shown in Fig. 50, the pressure can be reduced to the pressure P2 lower than the pressure P1 when the thermosetting adhesive 306b is hardened, and the stress of the IC chip 1 and the circuit board 4 can be alleviated (in other words, the degree of stress concentration can be reduced) as shown in Fig. 49D by removing the hardening distortion unevenly distributed inside the resin with the pressure P2. Subsequently, by increasing the pressure to the pressure P1, a pressure required for the deformation and adaptation of the bump can be obtained and the excessive resin can be forced out of the space between the IC chip 1 and the board 4, improving the reliability.

It is to be noted that the aforementioned "adhesive strength of the IC chip 1 and the circuit board 4" means a force to make the IC chip 1 and the board 4 adhere to each other. With this regard, the IC chip 1 and the board 4 are bonded together by the three forces of an adhesive strength provided by the adhesive, a hardening shrinkage force when the adhesive is hardened, and a shrinkage force (for example, a shrinkage force generated when the adhesive heated to a temperature of, for example, 180°C shrinks when returning to the normal temperature) in

the Z-direction.

(Twenty-Third Embodiment)

A method and apparatus for mounting an electronic component of, for example, an IC chip on a circuit board and an electronic component unit or module of, for example, a semiconductor device in which the IC chip is mounted on the board by the mounting method, according to a twenty-third embodiment of the present invention will be described next with reference to Fig. 49 and Fig. 50. According to this twenty-third embodiment, the inorganic filler 6f mixed with the insulating resin 306m in each of the aforementioned embodiments has a mean particle diameter of not smaller than 3 μm. It is to be noted that the maximum mean particle diameter of the inorganic filler 6f is assumed to have a dimension that does not exceed the gap dimension between the IC chip 1 and the board 4 after bonding.

If fine particles having a mean particle diameter smaller than 3 μm are used as the inorganic filler 6f when the insulating resin 306m is mixed with the inorganic filler 6f, then the surface area of those particles becomes large as a whole, and this possibly leads to moisture absorption to the periphery of the inorganic filler 6f of the fine particles that have a mean particle diameter smaller than 3 μm, which is disadvantageous in terms of the